

TRANSLATION

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 496Me/G1e	FOR FURTHER ACTION	See Form PCT/IPEA/416
International application No. PCT/EP2004/010237	International filing date (<i>day/month/year</i>) 14.09.2004	Priority date (<i>day/month/year</i>) 11.11.2003
International Patent Classification (IPC) or national classification and IPC G01 R31/S33, G01 R31/Q27, H01 H1/00, H01 H9/00		
Applicant MASCHINENFABRIK REINHAUSEN GMBH		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of <u>7</u> sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising: a. <input checked="" type="checkbox"/> (<i>sent to the applicant and to the International Bureau</i>) a total of <u>12</u> sheets, as follows: <input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions). <input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box. b. <input type="checkbox"/> (<i>sent to the International Bureau only</i>) a total of _____, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).
4. This report contains indications relating to the following items: <input checked="" type="checkbox"/> Box No. I Basis of the report <input type="checkbox"/> Box No. II Priority <input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability <input type="checkbox"/> Box No. IV Lack of unity of invention <input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement <input type="checkbox"/> Box No. VI Certain documents cited <input type="checkbox"/> Box No. VII Certain defects in the international application <input type="checkbox"/> Box No. VIII Certain observations on the international application

Date of submission of the demand	Date of completion of this report
Name and mailing address of the IPEA/EP	Authorized officer
Facsimile No.	Telephone No.

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/EP2004/010237

Box No. I Basis of the report

1. With regard to the language, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on translations from the original language into the following language _____, which is the language of a translation furnished for the purposes of:
- ☐ international search (Rule 12.3 and 23.1(b))
- ☐ publication of the international application (Rule 12.4)
- ☐ international preliminary examination (Rule 55.2 and/or 55.3)
2. With regard to the elements of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:
- ☐ the international application as originally filed/furnished
- ☒ the description:
- pages _____ as originally filed/furnished
- pages* 1-5 received by this Authority on 14.02.2005 with letter of 09.02.2005
- pages* _____ received by this Authority on _____
- ☒ the claims:
- nos. _____ as originally filed/furnished
- nos.* _____ as amended (together with any statement) under Article 19
- nos.* 1 received by this Authority on 14.02.2005 with letter of 09.02.2005
- nos.* _____ received by this Authority on _____
- ☒ the drawings:
- sheets _____ as originally filed/furnished
- sheets* 1/6-6/6 received by this Authority on 14.02.2005 with letter of 09.02.2005
- sheets* _____ received by this Authority on _____
- ☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.
3. ☐ The amendments have resulted in the cancellation of:
- ☐ the description, pages _____
- ☐ the claims, nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing (*specify*): _____
- ☐ any table(s) related to sequence listing (*specify*): _____
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
- ☐ the description, pages _____
- ☐ the claims, nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing (*specify*): _____
- ☐ any table(s) related to sequence listing (*specify*): _____

* If item 4 applies, some or all of those sheets may be marked "superseded."

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/EP2004/010237

Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement		
1.	Statement		
	Novelty (N)	Claims <u>1</u>	YES
		Claims _____	NO
	Inventive step (IS)	Claims <u>1</u>	YES
		Claims _____	NO
	Industrial applicability (IA)	Claims <u>1</u>	YES
		Claims _____	NO
2.	Citations and explanations (Rule 70.7)		
1.	This report makes reference to the following document:		
D1:	DE-C-10003918 (Maschinenfabrik Reinhausen GmbH), 5 July 2001		
2.	Novelty		
2.1	Claim 1		
2.1.1	Document D1 (figure 1) discloses a process for monitoring contact erosion in stepped switches, the process having the following steps:		
	<ul style="list-style-type: none"> • permanent storage (cf. page 4, lines 4-6) of the nominal stepped voltage values (U_s, cf. line 5) of each possible circuit, i.e. step, admissible contact erosion limit values (cf. line 5) of the switching contact, as well as parameters a and b, which are specific to the resistance contacts and stepped switch (cf. lines 35-42; values a and b are used in the calculation and thus must also be stored in a non-volatile manner); • determination of the present position n of the stepped switch (cf. page 4, lines 8-9); • measurement of the load current (IL) during each 		

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	<p>switching operation, i.e. actuation of the stepped switch (cf. page 4, line 11);</p> <ul style="list-style-type: none"> • determination of the switching direction "up" or "down" of each switching operation (cf. page 4, lines 13-14, and figure 1, 11th-13th frame from the top); • switching direction-dependent determination of the switched, eroded fixed contact (cf. page 4, line 14; and figure 1, 12th and 13th frame from the top); • switching direction-dependent calculation of switching contact erosion rates (A_{SK}) (cf. page 4, line 35) according to the equation $A_{SK} = a_{SK} \cdot l_{sk}^b \cdot s_{sk}$ (cf. page 4, line 35); • summation of the respective erosion rates (A_{SK}, A_{WK}) to obtain a total erosion volume (GA_{SK}, GA_{WK-A}, GA_{WK-B}) (cf. page 4, line 45, "added up...", and formulae in lines 48 and 52), non-volatile storage of all summed total erosion volumes (cf. page 4, line 45, "stored...") and comparison of these values with the corresponding, permanently stored limit values (cf. page 5, lines 1-4); • generation of warnings when the corresponding limit values or percentual limits thereof are exceeded (cf. page 5, lines 4-5). <p>2.1.2 The subject matter of claim 2 differs from D1 by the following features:</p> <ul style="list-style-type: none"> • monitoring the switches with at least one switch-over reactance;

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	<ul style="list-style-type: none"> • calculating the ohmic component R and the inductive component X of the switch-over reactance; • calculating the circuit current I_c as a fraction of the load current I_L; • determining whether it is necessary to switch from a non-bridging to a bridging position; • calculating the switching current of the contacts being switched off by means of the equation $I_{SK}=I_L/2$, when the switch is switched from non-bridging to bridging, and by means of the equations $I_{SK}=I_L*(R-jX)-jI_c$ and $I_{SK}=I_L*(R-jX)+jI_c$ in all other cases; • calculating, as a function of switching direction, the corresponding erosion rates of the fixed contact (A_{FK}) being switched off, by means of the equation $A_{FK}=a_{FK}*I_{SK}^b*s_{FK}$. <p>2.1.3 Consequently, the subject matter of claim 1 is novel and meets the requirements of PCT Article 33(2).</p> <p>3. Inventive step</p> <p>3.1 Claim 1</p> <p>3.1.1 The effect of these additional features is to make it possible to monitor contact erosion in load selectors with switch-over reactance which include bridging and non-bridging positions of the switching contacts.</p> <p>3.1.2 The technical problem addressed can thus be</p>

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	<p>considered to be that of monitoring contact erosion in load selectors with switch-over reactance which include bridging and non-bridging positions of the switching contacts.</p> <p>3.1.3 Document D1 does not contain any indication on how to monitor contact erosion in this type of load selector. Moreover, a person skilled in the field of stepped switch testing technology would not arrive at a solution as proposed claim 1 without an inventive input.</p> <p>3.1.4 The subject matter of claim 1 therefore involves an inventive step (PCT Article 33(3)).</p> <p>4. Clarity</p> <p>The application does not meet the requirements of PCT Article 6 because claim 1 is unclear. The reasons therefor are as follows:</p> <p>4.1 The expression "with at least one switch-over reactance" leads to the conclusion that stepped switches having only one or, for example, three switch-over reactances, could also be meant. In the case of a single switch-over reactance, this causes formula $I_{sk} = IL/2$ (cf. claim 1, line 19) to be incorrect. In the case of three or more switch-over reactances, this makes it impossible for the reader to use the process as per claim 1. Moreover, the reader would not know how the step switch is constructed. However, the original description (cf. page 3, last paragraph) indicates</p>

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	<p>that the switch-over reactance "is symmetrically divided in two parts" and that each of the two movable switching contacts of the stepped switch is connected by one of these symmetrical parts of the switch-over reactance to the load discharge (cf. page 2, line 2, in connection with page 3, paragraph 2, lines 4-5, and figure 5). The movable switching contacts serve for switching between fixed step contacts (cf. page 3, paragraph 2, and figure 5), a first movable step contact first leaving a first fixed step contact and switching to a second fixed step contact, then the second movable step contact leaving the first fixed step contact and switching to the second fixed step contact.</p> <p>4.2 The definition of parameters "a" and "b" is unclear to the reader of claim 1. However, the original description (cf. page 5, paragraph 2) defines these parameters.</p> <p>4.3 It is unclear to the reader whether the parameter(s) "a" (cf. line 6) correspond(s) to the parameters "ask" and "afk" (cf. lines 26, 27). However, this relationship is indicated in the original description (cf. page 5, formula after the first paragraph and in the second paragraph).</p> <p>5. Industrial applicability</p> <p>The subject matter of the above-mentioned claims meets the requirements of PCT Article 33(4).</p>